Northern Rhodesia

Department of Agriculture

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Department of Agriculture

ANNUAL REPORT FOR THE YEAR, 1948

INTRODUCTION.

1. The year saw some definite steps forward, especially in respect of certain projects listed under development and welfare schemes. The Tobacco Experimental Station at Choma was opened, the buildings erected and crops planted. The building of an agricultural training school, at Monze, was almost completed and as at Choma, the building work was carried out entirely by members of the Agricultural Department. Plans for the Territory's Agricultural Research were drafted and provision made in the 1949 Estimates for a very large increase in European staff. An Agricultural Officer was posted to Barotseland for the first time and began work at the Development Centre there. A Natural Resources Committee began work on drafting Natural Resources Legislation for the Territory and the first machines which are to be part of the mechanised units for work under the proposed Natural Resources Board were purchased. A special scheme for intensive work to improve conditions in a particularly exhausted area (South Chewa) was started and the African Improved Farmers' Scheme was revised and was put on, it is considered, a sounder basis. Facilities were made for Africans in the chief maize growing area to purchase fertilizer under the guidance of the Department. Assistance was given in establishing peasant group farmers on the land.

2. There were rises in the prices to the producer of both maize and wheat. The production of the former was a record and for the first time for some years the margin between consumption and production was closed. When this becomes a permanency, interest in other farm products will expand and progress towards that desirable goal of a better balanced and somewhat more intensive agriculture will be accelerated.

AGRICULTURE IN THE TERRITORY.

3. The year 1948 was a good one for the maize growers but tobacco planters were not so well suited by the weather ; excellent crops of maize were harvested but the tobacco yields were low and quality suffered. The severe drought in 1947, the heavy rains in the first half of 1948, followed by the exceptionally poor planting conditions at the end of the year emphasise the fact that in Northern Rhodesia few planting seasons can be described as normal.

Maize.

4. The good rains suited the maize crop and many farmers harvested a bigger crop than they have had for some time. As the acreage planted was also increased the result was that a record crop was delivered to the depots. This increased acreage was partly due to the improved position as regards the supply of tractors although the full effect of this will not be reflected until subsequent years.

ACREAGE PLANTED TO MAIZE BY EUROPEAN FARMERS.

Season	*No. of acres*
1946–47	48,900
1947–48	65,800
1948–49	75,000

5. African growers in the maize belt also had an excellent season and delivered a record number of bags of maize for sale.

MAIZE PRODUCTION FOR SALE.

(Thousands of bags.)

Season	*European grown*	*African grown*	*Total*
1943	144	60	204
1944	212	115	327
1945	273	202	475
1946	268	172	440
1947	190	54	244
1948	343	296	639

In addition, 11,000 bags were bought by the Maize Control Board from farmers outside the maize control area. It is estimated that European farmers retained 92,000 bags of maize on the farms for feeding labour and stock.

6. For the crops sold in 1948, European farmers were paid £1 5*s*. 8*d*. per bag (including the cost of the bag) delivered to the depots and in addition received an " inducement bonus " of five shillings a bag for each bag of maize delivered in excess of their average annual delivery over the past five years. In cases where a farmer had not been producing maize for five years, or was in his first year a different method was adopted—in the case of the new farmer the bonus being paid on bags delivered in excess of a delivery yield of six bags per acre.

7. African producers on the line of rail received £1 1*s*. 0*d*. per bag but under the African Improved Farmers Scheme, those certified as having adopted minimum prescribed improvements in their methods of cultivation received £1 5*s*. 3*d*. per bag and the bonus for maize sold in excess of a delivery yield of six bags per acre was also paid to those who qualified.

8. The number of improved African farmers to whom certificates were issued during the year was 305.

9. The difference between the European price and the prices paid to Africans goes into the Native Maize (Controlled Areas) Fund (now known as the African Farming Improvement Fund), which is utilized for the benefit of the African cultivators in the Maize Control Areas.

10. During the year a committee was appointed by Government to review the cost of production of maize—mainly on account of the fact that the existing figures related largely to production on non-mechanised lines, whereas, with the tractor and other implements taking the place of oxen, and to some extent manual labour, a revision seemed desirable. The terms of reference were " To review the existing cost of maize production with a view to submitting to Government, if considered necessary, recommendations for a revised formula which would enable Government to establish a new maize price for the 1948 planting season ".

11. After considering the Committee's Report, Government fixed a price of £1 7*s*. 0*d*. per bag of maize, excluding the cost of the bag, for maize delivered to depots by European farmers in the Maize Control Area during 1949.

12. As regards African grown maize, two changes were decided on in respect of prices paid for the 1948–49 planted crop, the first being that the improved farmers bonus will be paid in relation to the acreage cultivated on approved lines, instead of as previously on each bag of maize produced. This will cause less emphasis to be place on total production of maize—which is essential for the good of these particular areas and will also make it practicable for the scheme to be supervised as it expands, which has not been possible under the payment per bag system—for various reasons, one of which is the difficulty, or impossibility of ascertaining without a lot of work, that the maize sold by an improved farmer was all grown by himself.

13. The second change to take effect in regard to new prices for Africans is that producers off the line of rail will now receive the same price as those delivering to on the line depots, with the result, it is confidently hoped, that production will be encouraged over a wider area, lands at a distance from the railway thereby being better utilized and overcrowding near the line will be arrested and alleviated.

Wheat.

14. Wheat growing is becoming less popular with farmers, largely owing to the extra supervision involved and labour difficulties. Production was only 9,000 bags in 1948 and 5,000 bags in 1947, compared with an average annual production of 23,500 bags in the previous four years.

15. This was in spite of the fact that as a result of a close examination of the costs of production of this crop the price for 1948 and 1949 produced wheat, was raised from 35*s*. per bag to 45*s*. However, when the local maize market becomes saturated, farmers will pay more attention to other crops, including wheat.

Rice.

16. More interest is now being taken in the production of rice for which crop there are suitable conditions in many parts of the country. Production is negligible in relation to the possibilities of expansion and the bulk of the territorial requirements are imported from Tanganyika Territory over the Great North Road at very heavy cost in transport.

17. Mr. G. Lacey, C.I.E., and Mr. R. Watson, C.M.G., O.B.E., of the East African Rice Mission visited Northern Rhodesia in July and August and toured some of the promising rice growing areas. Their report indicates that there are favourable prospects for expanding rice cultivation, notably in the Bangweulu Swamps region, in the Luapula Valley, on the Kafue Flats and in many of the large seepage areas which are found in many parts of the Territory.

Beans and Ground-nuts.

18. Although the production of beans and ground-nuts is increasing, supplies from local sources are far below requirements. Ground-nuts are becoming a minor secondary crop to tobacco on many farms in the western area and the policy is to encourage this as much as possible.

19. The largest producing area is Petauke District in the Eastern Province ; this District marketed 6,000 bags in 1948 which were sold for 54*s*. a bag of 180 lb. of shelled nuts on the line of rail.

Tobacco : Eastern Area.

20. The heavy rains adversely affected the flue-cured Virginia crop in the Eastern Province and yields and quality were below average. During the year the number of tobacco planters increased from eighty-eight to 105. The flue-cured Virginia crop amounted to 2,988,000 lb. compared with 2,928,662 lb. in 1944, while the average price paid for non-quota tobacco increased from 21.23 pence per lb. in 1947 to 29.54 pence per lb. in 1948.

21. The Petauke Producers' Association of African growers had a most satisfactory season and sold seventy tons of Burley tobacco at the very good average price of 30 pence per lb. This flourishing young enterprise is still expanding and there are 1,900 growers in 1949 compared with 1,100 growers in 1948.

Tobacco: Western Area.

22. Tobacco in the western area did not benefit from the heavy rains; yields were low and the quality not very high. The rains leached out so much fertilizer that many farmers had to fertilize twice. It was estimated that nearly half a million pounds of tobacco were lost because of bad weather, disease and lack of barn space. The vagaries of the weather made it very difficult to plant the 1949 crop, but despite these difficulties a fair crop of good quality tobacco is expected.

23. The production of flue-cured Virginia tobacco amounted to 781,500 lb. compared with 500,000 lb. in the previous year. The tobacco sold on the auction floors in Salisbury (547,402 lb.), realized an average price of 31.05 pence per lb. whilst that portion of the crop which was exported direct to the United Kingdom (203,970 lb.) was sold there for an average price of 41.22 pence per lb. The remainder of the crop was sold privately.

24. There was a marked recession in the production of Turkish tobacco. A large proportion of the farmers who grew this tobacco have abandoned it and changed over to Virginia. The lower prices paid for Turkish, the long wait until payment is made and the demand for labour which this crop makes, are the principal reasons for the decline in production. Government assisted the growers by guaranteeing a loan made to the Northern Rhodesia Tobacco Co-operative Society, Ltd.

25. It is pleasing to record that many tobacco growers are making an effort to grow all the food they require for feeding their labour; some have produced food crops in excess of their own requirements.

26. There are many new tobacco growers in the western area some of whom are inexperienced in tobacco growing and curing and they, as well as more experienced growers, were considerably assisted by the Tobacco Adviser.

Vegetables, Potatoes and Fruit.

27. The production of potatoes and vegetables could be increased substantially, but lack of proper marketing arrangements together with the supervision and labour required, deters farmers from expanding this intensive type of farming. Although one rain-grown and two irrigated crops of potatoes can be grown annually there were long periods when no potatoes were available. An urgent requirement in Northern Rhodesia is a cool store for the storage of potatoes and vegetables to extend the marketing seasons.

28. Supplies of locally grown fruit were very limited in kind and quantity. There is a market for all kinds of fruit including citrus, pineapples and bananas which could be grown on a much larger scale in many parts of the Territory.

The Red Locust.

29. Apart from one small swarm of negligible importance reported from the Mpika District, there were no reports of red locust outside the outbreak areas under the control of the International Red Locust Organisation.

Agricultural Show.

30. The Agricultural Show which was again held in Lusaka in July, was opened by His Excellency the Governor and was very well attended. Both the Veterinary and Agricultural Departments staged exhibits which were appreciated by the public. On the whole, however, the Show was not well supported by the farmers and competition in most sections was very disappointing. There are reasons for hoping that there will be a definite improvement as regards support for the 1949 Show.

THE WORK OF THE DEPARTMENT.

Staff.

31. Mr. E. F. Martin (on transfer from Uganda) was appointed Director, in place of Mr. C. J. Lewin, M.C., who went on retirement. Mr. J. C. Eyre (on transfer from Palestine) was appointed Deputy Director in place of Mr. W. Allan, O.B.E., who was transferred to Mauritius as Director of Agriculture.

32. The establishment was increased during the year by the appointment of one Agricultural Officer and three new Agricultural Supervisors. Provision was made in the 1949 Estimates for a substantial increase in the European staff.

Ground-nut Project.

33. Widespread trial plots were planted in various parts of the Territory to test the suitability of different soils and climates for the larger scale production of ground-nuts. Simple fertilizer observations were also included. The yields in most areas were very satisfactory. These experiments are being continued in the Mumbwa District by an officer of the Overseas Food Corporation and they should give some more definite information as to whether there is any truth in the traditional belief of many here that ground-nuts planted on the same land invariably fail in the second year.

34. It was decided that the projected large scale mechanised production of ground-nuts in this Territory should not be started, at least for the present, and an alternative pilot scheme of combining maize and ground-nut production in the Mumbwa area was considered but not implemented.

Oil Palms.

35. An exploratory survey was made by an Agricultural Officer of the oil palms on Kilwa Island in Lake Mweru and in parts of the Luapula Valley. There are a number of palms growing in different parts of the Fort Rosebery and Kawambwa Districts but the only concentration of palms is on Kilwa Island where there are about 3,800 bearing palms which are estimated to yield 200 lb. of fruit per palm annually. Several other areas in the Luapula Valley exist which contain limited tracts of land probably suitable for oil palms.

36. At present the oil is extracted by primitive methods and sold to Greek traders on Lake Mweru engaged in the fishing industry and to African buyers on the mainland. The amounts sold are quite negligible and most of the oil palm crop is allowed to go unharvested. Thus a possible source of income to the Africans and a small but urgently required vegetable oil supply for the Territory is untouched. The present methods of extraction are most wasteful of oil and labour and the work is unpopular with the women. Plans for developing and expanding this industry, including the establishment of an efficient mill and a marketing organisation are under consideration.

EUROPEAN AGRICULTURE.

(a) General.

37. One Senior Agricultural Officer was engaged exclusively on advisory services to European farmers, mostly in the maize belt. The Senior Agricultural Officer, Choma gave assistance to tobacco planters in the Southern Province and the Western tobacco area generally was covered by the Tobacco Adviser. European farmers in the Eastern Province were given assistance by the Agricultural Officer in charge of the Province and by the Agricultural Supervisor in charge of the Msekera Tobacco Station.

38. There has been a large increase in the number of farmers on the Copperbelt, where a ready market for all kinds of fresh agricultural produce exists. The area is well watered but the soils are generally poor and require special treatment to maintain production. Many of these farmers are small-holders occupying areas of land from twenty to 300 acres in extent. Although there are dangers of trypanosomiasis in many parts of the Copperbelt, a few successful dairy industries have been established.

39. Towards the end of the year, the deliveries of tractors had improved to such an extent that it was no longer necessary for the Food Production Committee to allocate them. With the exception of some items, implements and equipment were also in better supply but there was little or no improvement in supplies of fencing wire, the lack of which is restricting the development of the cattle and dairy farms.

40. The Director of Agriculture, the Senior Agricultural Officer, Lusaka and three leading farmers paid a week's visit to Kenya to study the working of the Board of Agriculture in that Colony. The opportunity of seeing European agriculture in Kenya was much appreciated and valuable information was acquired through visiting farms and seeing the " set-up " for organising agricultural production.

(b) Soil Conservation.

41. The Senior Agricultural Officer, Lusaka continued to assist farmers in the maize belt with their conservation problems and to lay out and survey contour ridges and simple irrigation schemes. The number of farmers who realize the importance of protecting their lands from erosion is increasing steadily as the value of the work done in the past becomes more evident. There is, however, still an appreciable area of land farmed by Europeans on which little or nothing has been done to prevent erosion or to maintain the fertility of the soil and this is reflected in the low yields obtained from these lands. It is quite evident that, until such time as other methods may be found, it is essential to green manure a substantial proportion of the arable acreage annually, to maintain high yields of maize ; the value of these measures is all the more noticeable in seasons of poor rainfall.

42. Towards the end of the year a start was made with the collecting together of machinery to form mechanised conservation units in anticipation of the work to be done under the Natural Resources Legislation which is expected to be enacted in 1949. A Committee was appointed in 1948, " to examine and report on measures for conserving the natural resources of the Territory and to draft natural resources legislation ". Its work will not be completed until 1949, by which time it is hoped that some more machinery will be obtained, although the acquiring of this (especially the crawler tractors) is proving to be a very slow business and all that can be hoped for at present is one complete unit by the end of 1949.

(c) Experiments.

Lusaka Station.

43. Initially this station was opened to undertake trials on wheat which tended to become an important irrigated winter crop during the war. Interest in the growing of this crop has waned over the last few years until it has now become a crop of comparatively minor importance. The wheat trials have been continued but other work on the station, particularly work on pastures and fodder crops has been expanded.

44. Since wheat trials were started on this station five years ago, sixty-seven varieties and selections have been tried, most of which were imported from Southern Rhodesia, South Africa and Kenya. In these trials the Punjab 8A variety imported from Southern Rhodesia has given consistently good yields ; it is reasonably free from shattering but is more susceptible to rust infection than some other varieties. Sabanero, a more rust resistant variety, Kruger Bearded, Wit Klein Koren and Matopo have also proved satisfactory. In areas where more rust resistance is required, the selections 117A and 294M 7 imported from Kenya have yielded well. It has been found that selected seed which is bulked on the station gives consistently better returns than local seeds.

45. Trials of grasses and legumes have been started to meet the needs of the growing dairy industry. The use of grass leys as a rotation for arable lands to maintain soil structure to reduce weeds and to replace the present expensive but so far very necessary practice of alternate green manuring is being investigated. Grasses, both local and imported, are being tried and those showing most promise are being multiplied by planting out on a scale large enough for practical trials of an alternate arable ley system and for haymaking and winter grazing.

46. Experiments with irrigated pastures and fodder crops have also been started. In one trial nine acres of irrigated land were planted to annual grazing crops, three acres being planted to early oats, three acres to barley (in May) and three acres to Japanese Millet (in August). This area provided about three quarters of an hour's grazing per day for twenty-five to thirty head of cattle throughout the dry season. Sweet Yellow Lupin was a failure and Hubam Clover, although not of particular value as a grazing crop, proved valuable as a winter hay crop.

47. An experiment has been started in the Broken Hill District in co-operation with two farmers to find suitable methods of utilizing the large areas of seepage soils which are found in this district. Drainage schemes have been laid down in these and already the lands are beginning to "sweeten". An attempt is being made to develop a rotational system which will include rice, wheat and fodder crops followed by long periods under grass leys. If a satisfactory way of using these soils is found it will mean that large blocks of such lands, at present useless, will be added to the land assets of the Territory.

48. There is no doubt that interest is now beginning to be shown in this grass work and the establishment of "artificial" pastures. Up to the present rather more interest is taken by the tobacco planters than by maize growers, due mostly no doubt, to the fact that the tobacco planter still knows of no better rotation for tobacco than reverting to grass, so he is beginning to consider whether he might not do better than to have just "any old grass".

Mochipapa Tobacco Station, Choma.

49. This station which is intended to serve the tobacco industry in the western area was opened during the year. Its functions include the carrying out of trials in connection with the cultivation and curing of both Virginia tobacco and Turkish tobacco, experiments to evolve methods which will reduce the requirements of labour and to test and multiply seed for distribution to growers. Special attention is being given to finding suitable rotations for tobacco and how these can combine with the necessity for growing a certain amount of food for labour—or whether such food is better grown in an entirely separate food crop rotatation and not mixed in with tobacco. Attention is also being given to improved types of grasses for these soils and ways and means of making the best use of the cattle, which are usually ranched by tobacco farmers, for the benefit of the arable lands. Fertilizer and variety trials are also to be carried out.

50. Sixty acres of Virginia tobacco were planted (poor planting rains made it impossible to get in any Turkish) and an overhead rain maker was used for watering the seed beds. This was found to be very effective, giving improved results and of course, saved labour. Thirty acres of ground-nuts, ten acres of sunflower and forty acres of sunhemp were sown. All the lands opened up were laid out with contour ridges and contour ploughed. A block of six barns and farm buildings was built on a plan designed to minimise labour requirements. This was all done within the year and it is considered that the progress made is very satisfactory.

51. In order that the tobacco growers in the western area may share in the planning of the work to be done at this station, a small committee consisting of two members of the Agricultural Department and four prominent tobacco planters has been formed to decide all important matters relating to the station. This should ensure that more general interest is taken in it and the work of the Department benefits considerably from the advice received.

Msekera Tobacco Station, Fort Jameson.

52. This station which has been established for many years, serves the interests of the tobacco industry in the Eastern Province. Only a fair yield was obtained, the total being 12,093 lb. of flue-cured tobacco from twenty-three and a half acres, giving an average yield of 526 lb. per acre. The crop was sold for £2,070 13*s*. 6*d*. at an average price of 41.10 pence per lb.

53. Various rotations are being tried in addition to the standard four course rotation which has now been used on the station for fourteen years with no sign of decreasing yields. This rotation consists of two crops of tobacco, followed by sunhemp for seed followed by maize in the fourth year. The tobacco crops are fertilized at the rate of 150 lb. tobacco fertilizer per acre and the second tobacco crop also receives four and a half tons of compost per acre ; compost at the rate of eight tons per acre is applied to the maize crop. The soils at Msekera are fairly heavy and the same results would almost certainly not be obtained on lighter tobacco soils.

54. Twenty-six pounds of seed selected on the station were sold and ninety-eight pounds were blown and treated with silver nitrate for farmers.

55. At a meeting with the executive committee of the Eastern Province Farmers' Association it was agreed to form a committee similar to that set up earlier in the year in respect of the Choma Tobacco Station. This committee has met and has put forward some very useful proposals concerning the future work of this station.

AFRICAN AGRICULTURE.

(a) Conservation of Natural Resources.

56. The pace at which the African lands can be protected from erosion is largely determined by the availability of trained European and African staff. This has been mainly concentrated in the more over-crowded areas over the Tonga Plateau in the Southern Province and in parts of the Eastern Province. Although there cannot be spectacular advances and only a fraction of the land has already been protected, the total area of land coming under protection is being steadily increased year by year.

57. Perhaps the most important advance is that in a few areas, African cultivators have begun to appreciate the value of conservation measures and have made requests for assistance. But generally this is not the case and most conservation work is looked on as an unnecessary disturbance causing

hard work imposed on the people by Government against their will. In the maize control areas the expense in connection with conservation measures is met from the Native Maize (Controlled Areas) Fund and is thus borne by the African maize growers who benefit from the works out of the proceeds of their production of maize. These farmers are expected to maintain the conservation works on their lands themselves and considerable difficulty is experienced in getting them to do so. Provided that the work is done at a convenient time of the year, these same people are however, always very willing to turn out for the construction of small dams. Four new ones were constructed during the year, making a total of twenty-five which have been put in under the supervision of the Agricultural Department during the past three years.

58. In the Eastern Province experience gained over the last few years has shown that some of the soil conservation work carried out does not give adequate protection and the methods used have been modified as a result of the observations made. Conservation measures are being applied in thirty-one more villages in Petauke District and not much difficulty was experienced in starting the work as it was preceded by plenty of propaganda by the Provincial Administration and the Agricultural Department. People are now becoming accustomed to the idea that the whole Province will gradually be brought under control and that their particular area happens to be the next on the list. Nearly two hundred miles of contour ridges were constructed in the Kalichero area.

59. The number of Africans using ploughs in the Eastern Province is increasing rapidly. Africans living in some parts of the Province are not allowed to buy a plough unless they receive a permit from the Agricultural Officer ; permits are not issued unless the farmer has protected his land from soil erosion and understands how to plough on the contour. In the Maize Control Area a few Africans are acquiring tractors and this development will have to be carefully watched to ensure that these machines are used in a proper manner and do not lead to bad farming on a much bigger scale than is possible through the use of the ox drawn plough and the hoe.

60. In the Northern Province the development of hoe cultivation to replace the *Chitemene* system of axe agriculture has brought the danger of soil erosion and the need to pay more attention to soil conservation measures. The cultivated gardens are being protected by contour ridges at two and a half feet vertical intervals, pigeon peas being planted on the ridges. Similar measures are also being taken in part of the Mambwe Reserve where there is a more advanced agriculture which has evolved through population pressure and deforestation.

61. In addition to the intensive soil conservation undertaken in the resettlement areas in Ndola District, work of a more general nature was done in many of the Ndola Reserves ; this consisted of the protection of headwaters and water courses, early burning, the prevention of late fires and replacing cultivation on mounds by cultivation on ridges on the contour.

62. Soil conservation is the most arduous and difficult work which the Agricultural Department has to do and the advent of agricultural staff into new areas is not generally welcomed by the people as is the institution of other social services such as education and medical. The arrival of agricultural staff means that much more hard work must be done, traditional methods of husbandry and to some extent traditional diet, may be changed and some persons may be prosecuted for not obeying the rules which are made for the protection of their lands. The difficulties are increased by the fact that in many areas a large proportion of the active males are away from the districts and crop production is left to the women who are more conservative and even less able to appreciate the need for the changes.

(b) Peasant Farming Schemes.

63. Peasant farming schemes have been started in two districts in conjunction with the Commissioner for Native Development. At the end of the year there were three groups of peasant farmers in Serenje District and one at Katete in the Fort Jameson District. Those at Serenje have a total of twenty-six farmers. Each farmer has twenty acres of land demarcated as his farm and there is provision for extending each holding to forty acres, should it be shown that it is necessary to allow longer periods for the regeneration of cropped lands. As the traditional method of food production amongst the Lala tribe of Serenje District is a devastating form of axe agriculture, farming with ploughs and oxen is quite foreign to most of them. Each farmer has planted four or five acres and extra land has been cleared, stumped and ploughed to bring the total acreage ready for planting next year up to ten acres for each farmer.

64. The farms are laid out on the contour and measures are taken to prevent soil erosion. It is proposed to crop the land for three years and the farmer will then move on to the second block of ten acres, leaving the first to lie fallow and for grazing. It is doubtful whether the farmers will be able to look after a larger area then ten acres until they have had more experience of using implements. Two-thirds of the cultivated area of each farm is planted to grain crops and one-third to legumes. Manure is obtained from the cattle kraals which have been made for each group.

65. There are nine peasant farmers in the group which has been started at Katete. The change from traditional methods is not so revolutionary to these farmers and they are accustomed to handling cattle. They have had a fair season and should have some surplus maize and ground-nuts to sell. All are required to plant a minimum number of fruit trees.

66. A group of peasant farmers has become established on Native Trust Land near the Shiwa Ngandu Estate in the Northern Province. Most of these farmers are above the average in intelligence and have had some experience of more advanced methods of husbandry. They are farming comparatively large blocks of land and have been assisted with implements and oxen for ploughing by the Shiwa Ngandu Estate and they are given advice by the Estate Manager but do not receive any other assistance. A block of land has been demarcated and surveyed for a group of peasant farms in the Abercorn District.

(c) African Agricultural Education.

Agricultural Training School.

67. Progress was made in building the first of three projected agricultural training schools for Africans. This is being built at Monze on part of the agricultural station there. For the first two years it will train staff for all the Provinces but when similar schools have been established in the Northern and Eastern Provinces it will confine itself mainly to the needs of the Southern Province. The demand for trained African staff is so great that for some time to come those trained at these schools will be taken into the Department, but when these needs have been met it is intended that training shall be given to farmers, chiefs, Native Authority staff and others. The school at Monze will train about thirty students annually, the full course lasting two years. Before being admitted, all students must have passed the Standard VI examination and will first need to spend a few months at an agricultural station where they will be given some practical instruction and will be under observation for screening purposes to avoid as much wastage as possible once students are admitted to the schools. The course will include crop and animal husbandry, conservation, surveying and levelling, horticulture and irrigation, simple building, work in native areas including methods of approach and elementary soil science and botany including seed selection. A suitable proportion of the instruction will take place outside the lecture room and frequent visits will be made to places of interest mainly in native reserves.

School Gardens.

68. Much greater interest is now being shown in school gardens but lack of staff at present, makes it impossible for departmental officers to give all the assistance and supervision which is desirable. Much of the value of the education and training given through school gardens is lost to the districts because such a large proportion of the young men leave their homes for the centres of employment. In the Northern Province an experienced African Agricultural Assistant has been delegated to assist in the supervision of seventeen school gardens which come under departmental supervision. Twenty-two school gardens in the Province are staffed with teachers trained at Senga Hill and are supervised by the Principal. The Senga Hill school at which teachers are trained in agriculture and the management of school gardens is playing a notable part in furthering the school garden movement.

69. School gardens were maintained in the Kanchomba area of the Southern Province and eleven selected school gardens in the Monze and Magoye areas were provided with oxen and implements bought with money from the African maize fund. These gardens are required to reach the standards expected of " Improved African Farmers ". In addition to the selected gardens there are a number of others of lower standard. It has been found that through providing oxen and implements and responsible supervision the standard of school gardens has improved considerably. Further improvement will not be possible until some better agricultural training can be given to teachers.

70. The school garden movement showed considerable progress during the year throughout the Western Province, where the interest and enthusiasm of both school teachers and children for this work is increasing. Twelve new gardens were opened up during the year with the help of departmental staff and many others which it has not yet been possible to supervise have been started. A course of instruction lasting three weeks was given at Kambowa station for Native Authority staff; one chief, three councillors and ten other Native Authority officials from the Mwinilunga, Balovale and Solwezi Districts attended and took a keen and intelligent interest in the course.

71. At all agricultural stations, courses of varying duration were held for the African staff of the Department. This work, which has been considered essential, occupies a considerable part of European officers' time but much of it will no longer be necessary when staff can be properly trained at agricultural schools.

DEVELOPMENT OF AFRICAN AGRICULTURE IN THE PROVINCES.

Southern Province.

72. As in past years the activities of the Department were largely restricted to the Tonga chieftaincies in the Mazabuka District which is, economically, the most important area of native production in the Territory. Because of the increasing congestion of people and stock, the serious problems of soil deterioration and over-stocking are becoming more urgent. These problems were foreseen many years ago when it was realized that the increasing population and the urge towards economic advancement would make heavy demands on the soil in an area where room for expansion to new lands is limited. The African farmers are now using the ox plough and other simple implements. The sled is being superseded by the scotch cart as more roads are made and the next step may be the use of tractors and lorries; one African has now bought a tractor and there are a few who transport African grown maize to the depots in lorries which they own and operate themselves.

73. Some progress was made in the " Improved African Farmers Scheme ", which was introduced in 1947. The number of African farmers who succeeded in obtaining the certificate by carrying out to the satisfaction of the agricultural staff the required improvements, rose from ninety-five in 1947 to 303 in 1948. This is a fair start for the scheme when it is considered that even the simple improvements required are revolutionary to the cultivators. The aim of the scheme is mass improvement rather than the attainment of very high standards by a few. It is clear that there is a very long way to go before it can be claimed that this has been achieved and it is quite evident that the simple improvements now required are not enough to preserve completely the fertility of the lands in this area. The next step, which will require the ploughing in of a green manure crop, or possibly the planting of a grass ley, must be taken in the near future. The rotation at present permitted, whilst being an improvement on that generally practised will need to be altered to reduce the proportion of land under maize.

74. Criticism of the Improved African Farmers' Scheme was voiced by a small minority of substantial African farmers who had previously been able to enjoy an enhanced price for their maize (some of it acquired from others) without the necessity of complying with any improved farming conditions. Their simple expedient was to register themselves as maize producers with the Maize Control Board, thereby evading contributing to the Native Maize (Controlled Areas) Fund. The Maize Control Ordinance was amended during the year to prevent such evasion and in 1948 an enhanced price could be gained only by those who achieved the standard of husbandry required by the African Improved Farmers' Scheme.

75. The working of the scheme in 1948, showed that it was not satisfactory in some respects and that if there was any considerable expansion it would not be possible to provide the experienced staff to make the fairly accurate estimates of yield which the scheme required. A decision has been reached which will change the scheme to the extent that a bonus will be paid on the acreage farmed by approved methods. The estimation of acreages and inspection of the lands is a simple matter compared with the estimation of actual yields over a wide area during the few weeks when this work can be done. The bonus is also diverted from the bag of maize and acts as a minimum guaranteed return per acre of improved farm.

76. A further step to improve agricultural practice was the distribution, at the prevailing price, of about 350 bags of maize fertilizer to African farmers. The response to the scheme was below expectation, largely because of the unfavourable start to the season, which restricted planting and indicated uncertain prospects of economical use being made of the fertilizer.

77. The establishment of the Mbiya settlement near Magoye was completed. This is a smal experimental settlement on a 2,000 acre block of Native Trust Land adjoining a densely populated and heavily overstocked area. The cultivable land is in two blocks, each of which has been divided into four fields which were sub-divided into contour strips. These are separated from each other by contour ridges where slopes are steep or by grass strips on the gentler slopes. Thirty-four families representing a population of nearly 200 with over 400 head of cattle were settled. Each family has been allotted a strip of land in each of the four fields. The original intention was to permit of co-operative cultivation while retaining of course, individual ownership of the crops but it is still not certain whether the settlers will grasp the advantages of co-operation and so far they appear to be strongly individualistic.

78. There is no doubt that the institution of the "Parish" system in the Mazabuka District is excellent from the agricultural point of view as it leads to the dispersal of concentrations of livestock, gardens and humans more evenly over the terrain. Moreover, residence beside the cultivators land simplified the making and application of kraal manure and compost.

Eastern Province.

79. This Province has many serious rural problems arising from the over population in many parts. The resettlement schemes which have been carried out in recent years have materially relieved the pressure in some areas but there remain large tracts of land which are deteriorating rapidly, because of the consequences of too frequent cultivation and the reduction of the resting period to the bare minimum required to obtain another crop.

80. A great improvement has been effected over large parts of the Province as a result of making many hundreds of miles of conservation ridges and other measures which have been taken to prevent the soil eroding. This work is extending very satisfactorily but it must not be regarded as the only measure required for the rehabilitation of the worn out lands. These conservation measures will bring stability and prevent accelerated deterioration but the increase in yield which results is only small. Soil conservation must now be looked upon in a much broader sense and made synonymous with more intensive methods of husbandry.

81. A new station was opened in the South Chewa Reserve, where the accelerating pace of deterioration is causing much concern. It is considered that periodic visits by European staff cannot effect the necessary improvement and the area will therefore receive special attention by stationing in it an Administrative Officer and an Agricultural Officer to concentrate and work in this area alone. The staff, both European and African are living in bush quarters at present, but a good start has been made both with buildings and the planting of demonstration plots and trials. Special attention is being given to soil conservation measures and to intensifying agricultural methods by introducing planned rather than natural methods of regeneration, by using the seepage areas under controlled conditions, by the use of manure and by trial and introduction of a wider range of crops and grasses. Here, as in many other parts of the Eastern Province, far too much reliance is placed on maize as being the only important grain crop. If these people could be persuaded to diversify their diets far more, it would assist in solving many agricultural problems, quite apart from raising the generally poor standard of nutrition.

82. The flourishing Petauke Producers' Association now employ their own European manager and besides selling nearly a thousand bales of Burley tobacco, they sold 6,000 bags of ground-nuts.

83. The small cotton growing industry in the Luangwa Valley which has been kept alive for many years, received much encouragement by an increase in the prices paid to a level more nearly approaching present day prices. There were only fifty-nine growers last year, but it is expected that there will be about 300 growers in 1949. The marketing and ginning of the crop has been handed over by the Department to a co-operative organisation to be fostered by the Registrar of Co-operative Societies.

84. Rice cultivation is being extended and more attention is being given to this valuable crop which could be grown in many of the seepage areas not now used for crop production. A supply of Faya paddy seed was imported from Nyasland for distribution and sale to those wishing to grow. The incentive to increased production of rice has largely come from the high prices paid at present.

Northern Province.

85. The agricultural staff here was quite inadequate to give more than intermittent attention to many districts in this large Province and work was necessarily restricted to limited areas. Special attention was given to controlling the *Chitemene* practices and control is now exercised over about 3,000 square miles in which there are 20,000 people. Concurrently with the control of *Chitemene* cutting, active encouragement is being given to encouraging hoe cultivation. It is believed that the size of the area which has in the past been allowed under the rules for tree cutting in some districts is too large and that larger areas of woodland are being lopped than can be replaced by natural regeneration as this appears to be slower than was at first expected. Many of the people now realize that it is only a question of time and short time, before their age old system of axe agriculture can no longer provide them with their essential food and that they must start a system of hoe cultivation.

86. The development of hoe cultivation has brought the danger of soil erosion and in the areas under control all cultivated gardens are protected by contour banks at vertical intervals of two and a half feet.

87. A rice industry is being developed in the Bangweulu region of Luwingu District where it is known that conditions for growing this crop are very suitable.

88. There are five seed farms in the Province which demonstrate the use of compost, contour cultivation, grass fallows and seed selection. The farms vary in size from five to twenty acres and seed of new crops and better varieties, as well as common fruit trees, is distributed from the farms which the Native Authorities are encouraged to take an active interest in.

Central Province.

89. The Senior Agricultural Supervisor at Serenje is the only officer stationed in the Province and almost the whole of his time has been devoted to establishing and developing peasant farming groups. The *Chitemene* system of agriculture practised by the Lala tribe in this district is far more devastating in its effects than the *Chitemene* system used elsewhere. As in other areas where a similar form of agriculture is practised, the basic reason for it is an easy and effective method of growing finger millet. To change this will necessitate a substantial change in diet. This has in some instances begun but must be accelerated by the growing of sorghums by hoe cultivation.

90. The methods recommended for tackling this question are :

(*a*) To demonstrate the cultivation of kaffir-corn and other subsidiary crops by demonstration gardens at Native Authority centres or in areas where there is a concentration of population. This demonstration to be immediately followed by orders for everyone to cultivate a minimum sized kaffir-corn garden with annual extensions.

(*b*) Simultaneously to introduce some control over the cutting of gardens for finger millet. This cannot be done too suddenly. At first the restriction of the number of circles—say from the average at present of 150 to five or ten, with propaganda for restriction to one circle. The lopping of trees in certain areas where there are big trees could be tried ; this will be difficult to enforce.

(*c*) To encourage, if possible, not by order, the use of the *Chitemene* burnt gardens for two or three years by planting other crops—ground-nuts, ground beans, kaffir-corn, cassava and sweet potatoes. This proposal has the apparent disadvantage that it may encourage too much use of *Chitemene*, and keep the system going for years. This, however, will not be the case in practice. It is very doubtful if there is any other means of bridging the interim gap between the present traditional *Chitemene* practice and the introduction of cultivation, without the grave risk of food shortage.

(*d*) To develop the subsidiary gardens. The Lala have a number of these types of gardens ; also it will be necessary for each house-hold to have a cassava garden.

(*e*) Early burning and the protection of watersheds, steep slopes and head-water areas to be strictly enforced.

(*f*) To establish an agricultural sub-station at once for growing good selected kaffir-corn seed for distribution. This seed can be further bulked at the demonstration plots, school gardens and on the group farms. Widespread distribution of good seed is a most important factor and gives encouragement to the natives. Supplies of other good seed can also be grown, as well as supplies of selected and resistant types of cassava cuttings. This station will also do some important preliminary investigation work in the cultivation of dambos.

(*g*) Other measures, e.g. restricting the sale of finger millet, giving a bonus for kaffir-corn or maize grown under improved agricultural methods, etc.

91. Longer term work in this connection will include the group peasant farming trials, further research into land utilization in this area including full use of water, compost and possibly fertilizers, agricultural education in all its forms and marketing facilities for such economic crops as can be produced.

92. An Agricultural Officer visited Feira sub-district to report on agricultural conditions and the measures which could be taken to alleviate the occurrence of periodic famines there. Recommendations were made that the storage of grain food in bins should be organised, that famine reserve crops such as cassava and sweet potatoes should be planted and that the growing of rice, ground-nuts and sugar cane should be encouraged. If efforts to promote increased production are to have any real success an outlet must be provided for the people to sell their surplus crops in good years.

93. Africans in the Lusaka and Chisamba areas delivered 57,000 bags of maize to the Maize Control Board. It has so far not been possible to give these farmers the same assistance and attention as is given to African maize growers in the Southern Province but it is hoped that this will soon be rectified.

Western Province.

94. No further resettlement took place during the year in Ndola District where this was started in 1943. The resettled villages under Chief Chiwala and Chief Nkambo are establishing themselves well in their new environment and there are indications that newcomers are infiltrating slowly into these villages and that the area is becoming quite popular. In Chief Mushiri's area, many people from the remoter parts of the resettlement area are returning to their Reserve. The agriculture of all the 172 resettled villages received close supervision from agricultural staff and all gardens were satisfactorily protected against erosion by the people themselves.

95. An officer was stationed at Fort Rosebery for a short period of the year, but his time was largely taken up with the supervision of the ground-nut trial plots in various parts of the Territory and he was unable to give much attention to this potentially rich agricultural district. He was, however, able to make a survey of the present position and possibilities of extending oil palm production in the Lake Mweru regions.

96. It was possible to start some work in the rapidly developing Kabompo area in the extreme west, but the distance from Ndola makes it impossible to give this area any close supervision until staff is posted there.

97. Crops on the demonstration seed farm were outstandingly good and impressed the large number of chiefs, councillors and village headmen who visited it. A not unexpected comment from many of these visitors was that agriculture such as this was beyond the capabilities of the African, but everything is done to show that there is no basis for such a point of view and no implements are used except axes and hand hoes.

98. The attempts which have been made during the past five years to persuade Africans in the Ndola District to grow rice have been disappointing and the Lamba show no enthusiasm over growing this crop. A few who have grown the crop will not cultivate it properly or protect it from birds.

99. In areas close to the Copperbelt towns the production of vegetables by Africans is increasing. At present the kinds grown are mainly cabbage, carrots and tomatoes, but insufficient attempt is made to increase the number of kinds grown. A considerable quantity of seed was distributed to the vegetable growers at cost price.

Barotseland.

100. There has never been any agricultural staff stationed in Barotseland, but at the end of the year an Agricultural Officer was posted there and he is soon to be joined by an Agricultural Supervisor. A survey is being made of the present practices and systems of agriculture so that sound plans can be made for development. A small agricultural station is being opened for making trials of potentially useful new crops and for demonstrations of new methods. A detailed account of the proposals in respect of the agricultural work to be done at the development centre has been submitted to the Development Authority. The expense of transporting bulky produce from Barotseland places limits on the possibilities of expanding the production of crops for sale.

Experimental Work.

101. At the Kambowa station which has only recently been taken over by the Department, there are trials and experiments designed for the conditions of high rainfall which are characteristic of the Copperbelt.

102. The Ecologist has used this station for selecting and breeding kaffir-corn varieties (*Sorghum vulgare Pers*) and twenty-two varieties were planted, some of which gave exceptionally high yields. The highest yields were attained among the *coriaceum* hybrids. Seed of the highest yielders is being bulked and issued to villagers. The following table gives the average yields of the different types :

Type	*Colour of grain*	*Yield per acre in lb.*
Conspicuum	White	1,811
Coriaceum	White	1,958
Coriaceum	Coloured	1,774
Caffrorum	White	1,038

In addition, five varieties were planted at the seed farm on eight acres, giving an average yield of 2,165 lb. per acre ; the crop was planted in lines with a spacing of 3½ ft. × 1¼ ft. in early December and followed a legume crop. The eight varieties of American dwarf sorghums were again planted but gave disappointing results. These varieties have a strong tendency to lose their dwarf character under local conditions.

103. In the observation plots of different grasses, Giant Rhodes Grass and Naivasha Star Grass appear to give the best cover on these soils and are the easiest leys to establish. Grasses with a "tussocky" nature of growth do not give an adequate cover to the soil although Guinea Grass, Napier Fodder and *Pennisetum Polystachyon* have grown well.

104. In the rice variety trials, the mixed red variety known as Pemba gave the best yields and proved to be the most adaptable variety. A satisfactory white variety has not been found yet, but trials of new varieties are being continued.

105. At Lunzuwa in the Abercorn District, the long term experiments on rotations, manures and fertility were continued. Also, trials of a large number of crops and varieties including buckwheat, maize, finger millet, kaffir-corn, oats, wheat, sunflowers, ground-nuts, potatoes and various kinds of beans were made. It is found that continuous cropping results in a big increase in the weed flora which seems an additional reason why any system of rotations should include grass leys. The presence of couch grass was the biggest factor militating against production.

106. At Katete, in the Fort Jameson District, the station is on light, poor soils and is used for trials and experiments of native methods of agriculture. Recently, experiments have been laid down to test various methods of regenerating land by sowing grasses and other crops after the normal period of cultivation. Observations and visual demonstrations with burning are continuing, but it can already be seen that early burning promotes far quicker and denser regeneration of the bush vegetation.

107. At Petauke in the Eastern Province, experimental work is largely concerned with ground-nuts and Burley tobacco, two important cash crops in this area. In a tobacco spacing experiment, it was found that a spacing of $3\frac{1}{2}$ ft. $\times$ $1\frac{1}{4}$ ft. gave considerably larger yields of tobacco than wider spacings. During the last season, no increase in disease was noticed as a result of the closer spacings. In the rotation experiments, results indicate that alternate cropping of maize and ground-nuts gives better yields of maize and ground-nuts than interplanting these crops. The tobacco on the station yielded 8,464 lb. from nine and a half acres and realized £1,112 on the sales.

108. The ground-nut trials which were made for the Overseas Food Corporation, were planted on ten sites in different parts of the Territory. The average yields for the ten sites are as follows :

Variety	*Yields in lb. per acre of Kernels*
Natal Common	997
Valencia	875
Virginia Bunch	1,290
Lamba (local variety)	755
Ila (local variety)	629

109. These results show the superiority of the Natal Common and Virginia Bunch varieties. On most sites, applications of lime and superphosphate increased the yield. The highest yield obtained was 1,903 lb. of kernels per acre, on a plot in the Mumbwa District sown with Virginia Bunch.

Conclusion.

110. Owing to the large number of Boards and Committees of which the Director of Agriculture is a member it was necessary for attendances at meetings to be about equally divided with the Deputy. Such meetings included, the Land Board, the Maize Control Board, the Tsetse and Trypanosomiasis Committee, the Tractor Allocation Committee, the Natural Resources Committee, the Western Tobacco Board, the Railway Traffic Priorities Advisory Committee, the Standing Agricultural Veterinary and Forestry Committee (Central African Council), and the Special Committee on Joint Research (C.A.C.).

111. The Director also presided for part of the time over a meeting of the International Red Locust Control Organisation held at Salisbury, and took part in the work of the Directorate of this organisation. He was also an observer from the Central African Territories attending the inaugural meeting of the East African Advisory Council on Agriculture, Animal Industry and Forestry, held at Nairobi.

112. Special reference must be made to the departure from Northern Rhodesia of W. Allan, O.B.E., Assistant Director of Agriculture who has been transferred to Mauritius as Director of Agriculture after twenty years of outstanding service here.

113. It is desired to record my thanks for the co-operation extended to me by members of the Departmental Staff during this, my first year in the Territory, when it has been so necessary for me to seek, especially from the senior officers, advice on so many matters which has always been freely and ably given.

E. F. MARTIN,
Director of Agriculture.

MAZABUKA.